PATENT APPLICATION
Attorney Docket No.: Q66049

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Hiroshi KONUMA et al.

Divisional of Appln. No.: 09/233,451

Confirmation No.: Not yet assigned | Group Art Unit: Not yet assigned

Filed: September 26, 2001 | Examiner: Not yet assigned

For: SOLID ELECTROLYTIC CAPACITOR AND METHOD FOR PRODUCING THE SAME

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Amend the specification by inserting before the first line the sentence:

CROSS REFERENCE TO RELATED APPLICATIONS

This is a Divisional of Application No. 09/233,451 filed January 20, 1999, the disclosure of which is incorporated herein by reference.

IN THE CLAIMS:

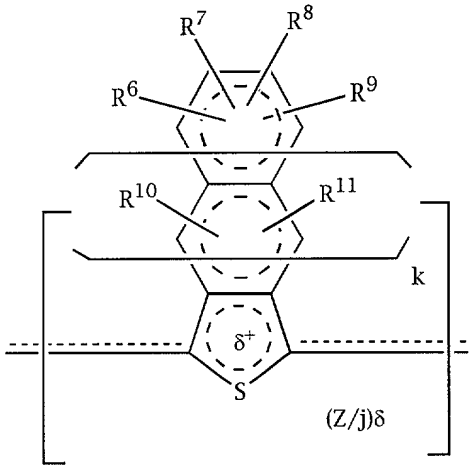
Claims 1-7 and 12-28 are canceled without prejudice or disclaimer.

The claims are amended as follows:

8. (amended) A solid electrolytic capacitor comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a

solid electrolyte layer provided on the dielectric film, wherein at least a portion of the solid electrolyte layer is of a lamellar structure,

in which the solid electrolyte layer comprises a composition containing a π-electron conjugate polymer and/or other electrically conducting polymer, in which the electrically conducting polymer is a condensed heteropolycyclic polymer comprising as a repeating unit a structural unit represented by general formula (III) below



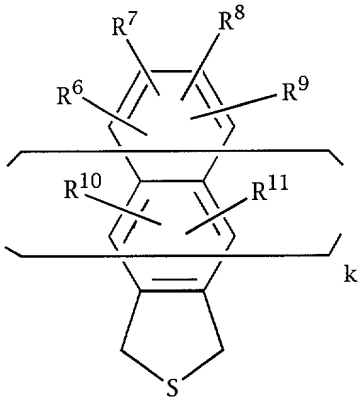
(III)

wherein the substituents R^6, R^7, R^8, R^9, R^{10} and R^{11} each independently represents a monovalent group selected from the group consisting of a hydrogen atom, a linear or branched, saturated or unsaturated Cl-10 alkyl, alkoxy or alkyl ester group, a halogen atom, a nitro group, a cyano group, a primary, secondary or tertiary amino group, a trihalomethyl group, a phenyl group and a substituted phenyl group, the alkyl chains of R^6, R^7, R^8, R^9, R^{10} and R^{11} may combine to each other at any position to form at least one divalent chain for forming at least one 3-, 4-, 5-, 6- or 7-membered saturated or unsaturated hydrocarbon cyclic structure together with the carbon atoms to which the substituents are bonded,

the alkyl group, the alkoxy group or the alkyl ester group of R^6, R^7, R^8, R^9, R^{10} or R^{11} or the cyclic hydrocarbon chain formed by the substituents may contain any number of any of carbonyl, ether, ester, amide, sulfide, sulfinyl, sulfonyl and imino bonds,

k represents a number of the condensed ring enclosed by the thiophene ring and the benzene ring having substituents R^6 to R^9 and represents an integer of from 0 to 3 excluding a form in which all of R^6 to R^9 represent a hydrogen atom from among derivatives in which k=0, and the condensed ring may optionally contain 1 to 2 nitrogen atoms or N-oxide, δ is in the range of 0 to 1, Z represents an anion, j is a valency of Z and is 1 or 2.

29. (amended) A method for producing a solid electrolytic capacitor comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer provided on the dielectric film, wherein at least a portion of the solid electrolyte layer is of a lamellar structure, the method comprising polymerizing a condensed heteropolycyclic compound represented by the following formula (VI):



(VI)

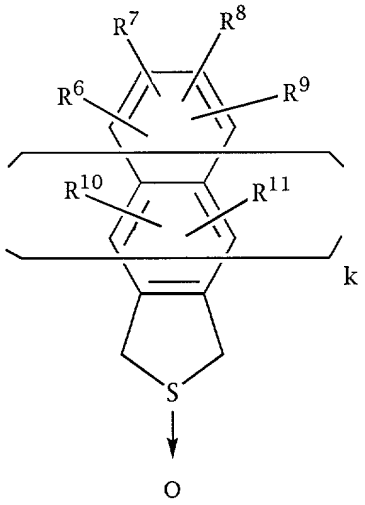
wherein the substituents R^6, R^7, R^8, R^9, R^{10} and R^{11} each independently represents a monovalent group selected from the group consisting of a hydrogen atom, a linear or branched, saturated or unsaturated Cl-10 alkyl, alkoxy or alkylester group, a halogen, a nitro group, a cyano group, a primary, secondary or tertiary amino group, a trihalomethyl group, a phenyl group and a substituted phenyl group, the alkyl chains of R^6, R^7, R^8, R^9, R^{10}, or R^{11} may combine to each other at any position to form at least one divalent chain for forming at least one 3-, 4-, 5-, 6- or 7-membered saturated or unsaturated hydrocarbon cyclic structure together with the carbon atoms to which the substituents are bonded,

the alkyl group, the alkoxy group or the alkylester group of R^6, R^7, R^8, R^9, R^{10} or R^{11} or the cyclic hydrocarbon chain formed by the substituents may contain any of carbonyl, ether, ester, amide, sulfide, sulfinyl, sulfonyl and imino bonds,

k represents a number of the condensed ring enclosed by the thiophene ring and the benzene ring having substituents R^6 to R^9 and represents an integer of from 0 to 3, and the condensed ring may optionally contain nitrogen or N-oxide alone or together with another anion having a dopant ability, on the dielectric film formed on a porous valve acting metal surface by the action of an oxidizing agent to form a solid electrolyte layer on the dielectric film.

32. (amended) A method for producing a solid electrolytic capacitor comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer provided on the dielectric film, wherein at least a portion of the solid electrolyte layer is of a lamellar structure, the

method comprising polymerizing a condensed heteropolycyclic compound represented by the following formula (VII):

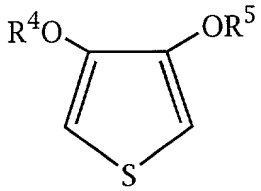


(VII)

wherein the substituents R^6, R^7 R^8, R^9, R^{10} and R^{11} each independently represents a monovalent group selected from the group consisting of a hydrogen atom, a linear or branched, saturated or unsaturated Cl-10 alkyl, alkoxy or alkylester group, a halogen, a nitro group, a cyano group, a primary, secondary or tertiary amino group, a trihalomethyl group, a phenyl group and a substituted phenyl group, the alkyl chains of R^6, R^7, R^8, R^9, R^{10}, or R^{11} may combine to each other at any position to form at least one divalent chain for forming at least one 3-, 4-, 5-, 6- or 7-membered saturated or unsaturated hydrocarbon cyclic structure together with the carbon atoms to which the substituents are bonded, the alkyl group, the alkoxy group or the alkylester group of R^6, R^7, R^8, R^9, R^{10} or R^{11} or the cyclic hydrocarbon chain formed by the substituents may contain any of carbonyl, ether, ester, amide, sulfide, sulfinyl, sulfonyl and imino bonds, and k represents a number of the condensed ring enclosed by the thiophene ring and the benzene ring having substituents R^6 to R^9 and represents an integer of from 0 to 3,

and the condensed ring may optionally contain nitrogen or N-oxide alone or together with another anion having a dopant ability, on the dielectric film formed on a porous valve acting metal surface by the action of an oxidizing agent to form a solid electrolyte layer on the dielectric film.

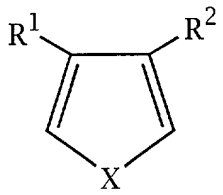
35. (amended) A method for producing a solid electrolytic capacitor comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and an electrically conducting polythiophene composition as a solid electrolyte provided on the dielectric film, wherein at least a portion of the solid electrolyte layer is of a lamellar structure, the method comprising polymerizing a thiophene monomer represented by the following formula (IX):



(IX)

wherein R^4 and R^5 each independently represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 alkyl group or a substituent for forming at least one 5-, 6- or 7-membered heterocyclic structure containing the two oxygen elements shown in the formula by combining the C1-6 alkyl groups to each other at any position, the ring structure formed in the scope thereof includes a chemical structure such as a vinylene group which may be substituted and a substituted phenylene group which maybe substituted, in the presence of naphthalenesulfonate anion by the action of a persulfate to form a solid electrolyte layer on the dielectric film.

38. (amended) A method for producing a capacitor comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer comprising an electrically conducting polymer composition layer provided on the dielectric film, in which the composition contains sulfoquinone anion having at least one sulfo anion group and a quinone structure in the molecule in an amount of 0.1-50 mol % and an anion other than the sulfoquinone anion in the range of 0.1-10 mol %, in which the method comprises polymerizing a monomer compound represented by the following formula (VIII):

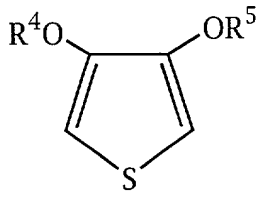


(VIII)

wherein R^1 and R^2 each independently represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 alkyl, a linear or branched, saturated or unsaturated C1-6 alkoxy group, a hydroxyl group, a halogen atom, a nitro group, a cyano group, a trihalomethyl group, a phenyl group and a substituted phenyl group, R^1 and R^2 may be combined to each other at any position to form at least one divalent chain for forming at least one 5-, 6- or 7-membered saturated or unsaturated ring structure, and X represents a hetero atom selected from S, O, Se, Te or NR^3, R^3 represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 hydrocarbon group, a phenyl group or a linear or branched, saturated or unsaturated C1-6 alkoxy group, the alkyl group and the alkoxy group represented by R^1, R^2 or R^3 may optionally contain in the chain thereof a carbonyl bond, an ether bond, an ester

bond, an amide bond or an imino bond, in the presence of a compound which donates a sulfoquinone anion by the action of an oxidizing agent to form a solid electrolyte layer.

39. (amended) The method for producing a solid electrolytic capacitor as claimed in claim 38, in which the monomer compound represented by general formula (VIII) above is a compound represented by the following general formula (IX):



(IX)

wherein R^4 and R^5 each independently represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 alkyl group or a substituent for forming at least one 5-, 6- or 7-membered heterocyclic structure containing the two oxygen elements shown in the formula by combining the C1-6 alkyl groups to each other at any position, the ring structure formed in the scope thereof includes a chemical structure such as a vinylene group which may be substituted and a substituted phenylene group which maybe substituted.

40. (amended) A method for producing a solid electrolytic capacitor comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer comprising an electrically conducting polymer composition provided on the dielectric film, in which the composition contains sulfoquinone anion having at least one sulfo anion group and a quinone structure in the molecule in an amount of 0.1-50 mol % and an anion other

than the sulfoquinone anion in the range of 0.1-10 mol %, the method comprising polymerizing a monomer by the action of an oxidizing agent to form a solid electrolyte layer on the dielectric film,

in which the method comprises the steps of dipping the valve acting metal having formed thereon the dielectric film layer in a solution containing a monomer compound, and dipping in a solution containing an oxidizing agent and a sulfoquinone anion.

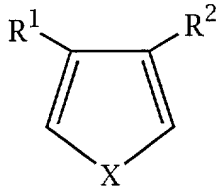
42. (amended) The method for producing a solid electrolytic capacitor as claimed in claim 41, in which the method comprises the step of repeating in a plurality of times the steps of dipping the valve acting metal having formed thereon the dielectric film layer in a solution containing a monomer compound and then dipping the metal in a solution containing an oxidizing agent and a sulfoquinone anion.

47. (amended) A method for producing a solid electrolytic capacitor comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer comprising an electrically conducting polymer composition provided on the dielectric film, in which the composition contains sulfoquinone anion having at least one sulfo anion group and a quinone structure in the molecule in an amount of 0.1-50 mol % and an anion other than the sulfoquinone anion in the range of 0.1-10 mol %, the method comprising polymerizing a monomer by the action of an oxidizing agent to form a solid electrolyte layer on the dielectric film,

in which the method comprises the steps of dipping the valve acting metal

having formed thereon the dielectric film layer in a solution containing an oxidizing agent and of dipping the metal in a solution containing a monomer compound and a sulfoquinone anion.

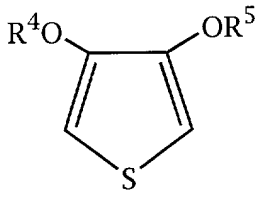
55. (amended) The method for producing a solid electrolytic capacitor as claimed in any one of claims 40-53, in which the oxidizing agent is a persulfate and the monomer compound is a compound represented by the following general formula (VIII)



(VIII)

wherein R^1 and R^2 each independently represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 alkyl, a linear or branched, saturated or unsaturated C1-6 alkoxy group, a hydroxyl group, a halogen atom, a nitro group, a cyano group, a trihalomethyl group, a phenyl group and a substituted phenyl group, R^1 and R^2 may be combined to each other at any position to form at least one divalent chain for forming at least one 5-, 6- or 7-membered saturated or unsaturated ring structure, and X represents a hetero atom selected from S, O, Se, Te or NR^3, R^3 represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 hydrocarbon group, a phenyl group or a linear or branched, saturated or unsaturated C1-6 alkoxy group, the alkyl group and the alkoxy group represented by R^1, R^2 or R^3 may optionally contain in the chain thereof a carbonyl bond, an ether bond, an ester bond, an amide bond or an imino bond.

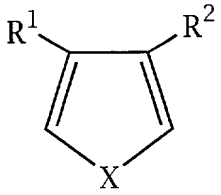
56. (amended) The method for producing a solid electrolytic capacitor as claimed in claim 55, in which the monomer compound represented by the general formula (VIII) above is a compound represented by the following formula (IX)



(IX)

wherein R^4 and R^5 each independently represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 alkyl group or a substituent for forming at least one 5-, 6- or 7-membered heterocyclic structure containing the two oxygen elements shown in the formula by combining the C1-6 alkyl groups to each other at any position, the ring structure formed in the scope thereof includes a chemical structure such as a vinylene group which may be substituted and a substituted phenylene group which maybe substituted.

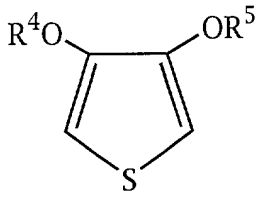
57. (amended) A method for producing a capacitor comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer comprising an electrically conducting polymer composition layer provided on the dielectric film, in which the composition contains at least one anthracenemonosulfonate anion selected from anthracenesulfonic acid having a sulfonate group or derivatives thereof as a dopant, the method comprising polymerizing a monomer compound by the action of an oxidizing agent on the oxide dielectric film, in which the compound represented by the following formula (VIII):



(VIII)

wherein R^1 and R^2 each independently represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 alkyl, a linear or branched, saturated or unsaturated C1-6 alkoxy group, a hydroxyl group, a halogen atom, a nitro group, a cyano group, a trihalomethyl group, a phenyl group and a substituted phenyl group, R^1 and R^2 may be combined to each other at any position to form at least one divalent chain for forming at least one 5-, 6- or 7-membered saturated or unsaturated ring structure, and X represents a hetero atom selected from S, O, Se, Te or NR^3, R^3 represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 hydrocarbon group, a phenyl group or an alkoxy group having a linear or branched, saturated or unsaturated C1-6 alkoxy group, the alkyl group and the alkoxy group represented by R^1, R^2 or R^3 may optionally contain in the chain thereof a carbonyl bond, an ether bond, an ester bond, an amide bond or an imino bond, is polymerized in the presence of a compound which donates at least one anthracenemonosulfonate anion selected from anthracenesulfonic acid and derivatives thereof to form a solid electrolyte layer.

58. (amended) The method for producing a solid electrolytic capacitor as claimed in claim 57, in which the monomer compound represented by general formula (VIII) above is a compound represented by the following general formula (IX):



(IX)

wherein R^4 and R^5 each independently represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 alkyl or a substituent for forming at least one 5-, 6- or 7-membered cyclic structure containing the two oxygen elements shown in the formula by combining the C1-6 alkyl groups to each other at any position, the ring structure formed in the scope thereof includes a chemical structure such as vinylene group which may be substituted and a substituted phenylene group which may be substituted.

59. (amended) A method for producing a solid electrolytic capacitor comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer comprising an electrically conducting polymer composition provided on the dielectric film, in which the composition contains at least one anthracenemonosulfonate anion selected from anthracenesulfonic acid having a sulfonate group or derivatives thereof as a dopant the method comprising polymerizing a monomer by the action of an oxidizing agent to form a solid electrolyte layer on the dielectric film,

in which the method comprises the steps of dipping the valve acting metal having formed thereon the dielectric film layer in a solution containing a monomer compound, and dipping in a solution containing an oxidizing agent and at least one anthracenemonosulfonate anion selected from anthracenesulfonic acid having one

sulfonate group and derivatives thereof.

66. (amended) A method for producing a solid electrolytic capacitor comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer comprising an electrically conducting polymer composition provided on the dielectric film, in which the composition contains at least one anthracenemonosulfonate anion selected from anthracenesulfonic acid having a sulfonate group or derivatives thereof as a dopant, the method comprising polymerizing a monomer by the action of an oxidizing agent to form a solid electrolyte layer on the dielectric film,

in which the method comprises the steps of dipping the valve acting metal having formed thereon the dielectric film layer in a solution containing an oxidizing agent and of dipping the metal in a solution containing a monomer compound and an anthracenemonosulfonate anion.

75. (amended) The method for producing a solid electrolytic capacitor as claimed in any one of claims 57 to 72, in which the oxidizing agent is a persulfate.

REMARKS

Claims 8-11 and 29-75 are all the claims pending in this application. Applicants have amended claims 8, 29, 32, 35, 38, 39, 40, 47, 55, 56, 57, 59 and 66 to prevent the claims from depending from a canceled claim. In addition, claim 42 was amended to depend from claim 41 and claim 75 was amended to depend from claims 57-72 instead of claims 57-73 to prevent claim 75 from improperly depending from another multiple dependent claim. Entry and consideration of this Amendment is respectfully requested.

Respectfully submitted,

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Date: September 26, 2001

APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification has been amended by inserting before the first line the sentence:

--CROSS REFERENCE TO RELATED APPLICATIONS

This is a Divisional of Application No. 09/233,451 filed January 20, 1999, the disclosure of which is incorporated herein by reference.--

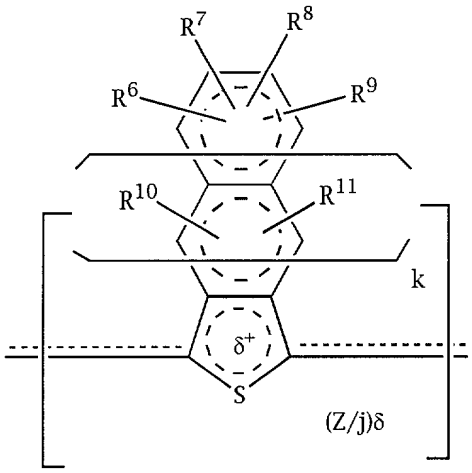
IN THE CLAIMS:

Claims 1-7 and 12-28 are canceled.

The claims are amended as follows:

8. (amended) **[**The**]** A solid electrolytic capacitor **[**as claimed in claim 5**]** comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer provided on the dielectric film, wherein at least a portion of the solid electrolyte layer is of a lamellar structure,

in which the solid electrolyte layer comprises a composition containing a π-electron conjugate polymer and/or other electrically conducting polymer, in which the electrically conducting polymer is a condensed heteropolycyclic polymer comprising as a repeating unit a structural unit represented by general formula (III) below



(III)

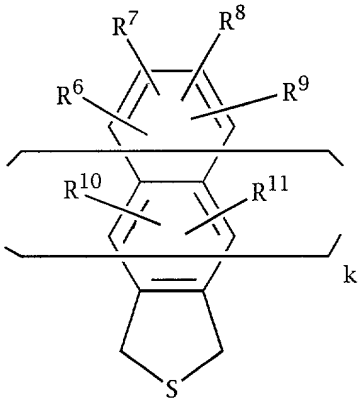
[(] wherein the substituents R^6, R^7, R^8, R^9, R^{10} and R^{11} each independently represents a monovalent group selected from the group consisting of a hydrogen atom, a linear or branched, saturated or unsaturated Cl-10 alkyl, alkoxy or alkyl ester group, a halogen atom, a nitro group, a cyano group, a primary, secondary or tertiary amino group, a trihalomethyl group, a phenyl group and a substituted phenyl group, the alkyl chains of R^6, R^7, R^8, R^9, R^{10} and R^{11} may combine to each other at any position to form at least one divalent chain for forming at least one 3-, 4-, 5-, 6- or 7-membered saturated or unsaturated hydrocarbon cyclic structure together with the carbon atoms to which the substituents are bonded,

the alkyl group, the alkoxy group or the alkyl ester group of R^6, R^7, R^8, R^9, R^{10} or R^{11} or the cyclic hydrocarbon chain formed by the substituents may contain any number of any of carbonyl, ether, ester, amide, sulfide, sulfinyl, sulfonyl and imino bonds,

k represents a number of the condensed ring enclosed by the thiophene ring and the benzene ring having substituents R^6 to R^9 and represents an integer of from 0

to 3 excluding a form in which all of R^6 to R^9 represent a hydrogen atom from among derivatives in which k=0, and the condensed ring may optionally contain 1 to 2 nitrogen atoms [(N)] or N-oxide, δ is in the range of 0 to 1, Z represents an anion, j is a valency of Z and is 1 or 2.[)]

29. (amended) A method for producing a solid electrolytic capacitor [as claimed in claim 1] comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer provided on the dielectric film, wherein at least a portion of the solid electrolyte layer is of a lamellar structure, the method comprising polymerizing a condensed heteropolycyclic compound represented by the following formula (VI):



(VI)

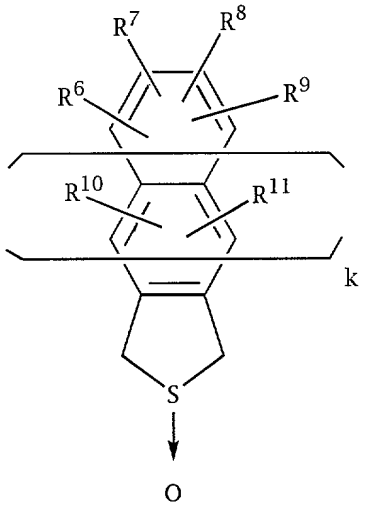
[(] wherein the substituents R^6, R^7, R^8, R^9, R^{10} and R^{11} each independently represents a monovalent group selected from the group consisting of [H] a hydrogen atom, a linear or branched, saturated or unsaturated Cl-10 alkyl, alkoxy or alkylester group, a halogen, a nitro group, a cyano group, a primary, secondary or tertiary amino group, a trihalomethyl group, a phenyl group and a substituted phenyl group, the alkyl chains of R^6, R^7, R^8, R^9, R^{10}, or R^{11} may combine to each other at any position to form at least

one divalent chain for forming at least one 3-, 4-, 5-, 6- or 7-membered saturated or unsaturated hydrocarbon cyclic structure together with the carbon atoms to which the substituents are bonded,

the alkyl group, the alkoxy group or the alkylester group of R^6, R^7, R^8, R^9, R^{10} or R^{11} or the cyclic hydrocarbon chain formed by the substituents may contain any of carbonyl, ether, ester, amide, sulfide, sulfinyl, sulfonyl and imino bonds,

k represents a number of the condensed ring enclosed by the thiophene ring and the benzene ring having substituents R^6 to R^9 and represents an integer of from 0 to 3, and the condensed ring may optionally contain nitrogen or N-oxide**[)]** alone or together with another anion having a dopant ability, on the dielectric film formed on a porous valve acting metal surface by the action of an oxidizing agent to form a solid electrolyte layer on the dielectric film.

32. (amended) A method for producing a solid electrolytic capacitor **[**as claimed in claim 1**]** comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer provided on the dielectric film, <u>wherein at least a portion of the solid electrolyte layer is of a lamellar structure,</u> the method comprising polymerizing a condensed heteropolycyclic compound represented by the following formula (VII):

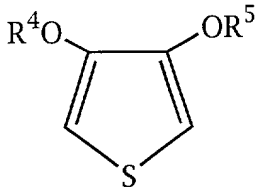


(VII)

[(] wherein the substituents R^6, R^7 R^8, R^9, R^{10} and R^{11} each independently represents a monovalent group selected from the group consisting of a hydrogen atom, a linear or branched, saturated or unsaturated Cl-10 alkyl, alkoxy or alkylester group, a halogen, a nitro group, a cyano group, a primary, secondary or tertiary amino group, a trihalomethyl group, a phenyl group and a substituted phenyl group, the alkyl chains of R^6, R^7, R^8, R^9, R^{10}, or R^{11} may combine to each other at any position to form at least one divalent chain for forming at least one 3-, 4-, 5-, 6- or 7-membered saturated or unsaturated hydrocarbon cyclic structure together with the carbon atoms to which the substituents are bonded, the alkyl group, the alkoxy group or the alkylester group of R^6, R^7, R^8, R^9, R^{10} or R^{11} or the cyclic hydrocarbon chain formed by the substituents may contain any of carbonyl, ether, ester, amide, sulfide, sulfinyl, sulfonyl and imino bonds, and k [have the same meanings as in general formula (VI) described in (29) above,] represents a number of the condensed ring enclosed by the thiophene ring and the benzene ring having substituents R^6 to R^9 and represents an integer of from 0 to 3, and the condensed ring may optionally contain nitrogen or N-oxide[)] alone or together

with another anion having a dopant ability, on the dielectric film formed on a porous valve acting metal surface by the action of an oxidizing agent to form a solid electrolyte layer on the dielectric film.

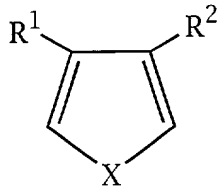
35. (amended) A method for producing a solid electrolytic capacitor [as claimed in claim 1] comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and an electrically conducting polythiophene composition as a solid electrolyte provided on the dielectric film, wherein at least a portion of the solid electrolyte layer is of a lamellar structure, the method comprising polymerizing a thiophene monomer represented by the following formula (IX):



(IX)

[(] wherein R^4 and R^5 [have the same meanings as defined in (17) above)] each independently represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 alkyl group or a substituent for forming at least one 5-, 6- or 7-membered heterocyclic structure containing the two oxygen elements shown in the formula by combining the C1-6 alkyl groups to each other at any position, the ring structure formed in the scope thereof includes a chemical structure such as a vinylene group which may be substituted and a substituted phenylene group which maybe substituted, in the presence of naphthalenesulfonate anion by the action of a persulfate to form a solid electrolyte layer on the dielectric film.

38. (amended) A method for producing a capacitor [as claimed in claim 15] comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer comprising an electrically conducting polymer composition layer provided on the dielectric film, in which the composition contains sulfoquinone anion having at least one sulfo anion group and a quinone structure in the molecule in an amount of 0.1-50 mol % and an anion other than the sulfoquinone anion in the range of 0.1-10 mol %, in which the method comprises polymerizing a monomer compound represented by the following formula (VIII):

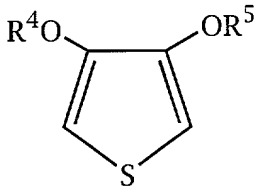


(VIII)

[(] wherein R^1 [,] and R^2 each independently represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 alkyl, a linear or branched, saturated or unsaturated C1-6 alkoxy group, a hydroxyl group, a halogen atom, a nitro group, a cyano group, a trihalomethyl group, a phenyl group and a substituted phenyl group, R^1 and R^2 may be combined to each other at any position to form at least one divalent chain for forming at least one 5-, 6- or 7-membered saturated or unsaturated ring structure, and X represents a hetero atom selected from S, O, Se, Te or NR^3, R^3 represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 hydrocarbon group, a phenyl group or a linear or branched, saturated or unsaturated C1-6 alkoxy group, the alkyl group and the alkoxy group represented by R^1, R^2 or R^3

may optionally contain in the chain thereof a carbonyl bond, an ether bond, an ester bond, an amide bond or an imino bond, [have the same meanings as defined in claim 16)] in the presence of a compound which donates a sulfoquinone anion by the action of an oxidizing agent to form a solid electrolyte layer.

39. (amended) The method for producing a solid electrolytic capacitor as claimed in claim 38, in which the monomer compound represented by general formula (VIII) above is a compound represented by the following general formula (IX):



(IX)

[(] wherein R^4 and R^5 [have the same meanings as defined in claim 17)] each independently represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 alkyl group or a substituent for forming at least one 5-, 6- or 7-membered heterocyclic structure containing the two oxygen elements shown in the formula by combining the C1-6 alkyl groups to each other at any position, the ring structure formed in the scope thereof includes a chemical structure such as a vinylene group which may be substituted and a substituted phenylene group which maybe substituted.

40. (amended) A method for producing a solid electrolytic capacitor [as claimed in claim 15] comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer comprising an electrically conducting polymer composition provided on the dielectric film, in

which the composition contains sulfoquinone anion having at least one sulfo anion group and a quinone structure in the molecule in an amount of 0.1-50 mol % and an anion other than the sulfoquinone anion in the range of 0.1-10 mol %, the method comprising polymerizing a monomer by the action of an oxidizing agent to form a solid electrolyte layer on the dielectric film,

in which the method comprises the steps of dipping the valve acting metal having formed thereon the dielectric film layer in a solution containing a monomer compound, and dipping in a solution containing an oxidizing agent and a sulfoquinone anion.

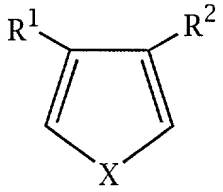
42. (amended) The method for producing a solid electrolytic capacitor as claimed in claim [43] 41, in which the method comprises the step of repeating in a plurality of times the steps of dipping the valve acting metal having formed thereon the dielectric film layer in a solution containing a monomer compound and then dipping the metal in a solution containing an oxidizing agent and a sulfoquinone anion.

47. (amended) A method for producing a solid electrolytic capacitor [as claimed in claim 15] comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer comprising an electrically conducting polymer composition provided on the dielectric film, in which the composition contains sulfoquinone anion having at least one sulfo anion group and a quinone structure in the molecule in an amount of 0.1-50 mol % and an anion other than the sulfoquinone anion in the range of 0.1-10 mol %, the method

comprising polymerizing a monomer by the action of an oxidizing agent to form a solid electrolyte layer on the dielectric film,

in which the method comprises the steps of dipping the valve acting metal having formed thereon the dielectric film layer in a solution containing an oxidizing agent and of dipping the metal in a solution containing a monomer compound and a sulfoquinone anion.

55. (amended) The method for producing a solid electrolytic capacitor as claimed in any one of claims 40-53, in which the oxidizing agent is a persulfate and the monomer compound is a compound represented by the following general formula (VIII)

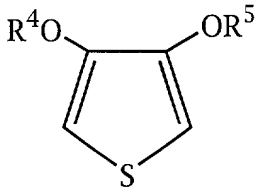


(VIII)

[(] wherein R^1 [,] and R^2 each independently represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 alkyl, a linear or branched, saturated or unsaturated C1-6 alkoxy group, a hydroxyl group, a halogen atom, a nitro group, a cyano group, a trihalomethyl group, a phenyl group and a substituted phenyl group, R^1 and R^2 may be combined to each other at any position to form at least one divalent chain for forming at least one 5-, 6- or 7-membered saturated or unsaturated ring structure, and X represents a hetero atom selected from S, O, Se, Te or NR^3, R^3 represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 hydrocarbon group, a phenyl group or a linear or branched, saturated or unsaturated

C1-6 alkoxy group, the alkyl group and the alkoxy group represented by R^1, R^2 or R^3 may optionally contain in the chain thereof a carbonyl bond, an ether bond, an ester bond, an amide bond or an imino bond, [have the same meanings as defined in claim 16)].

56. (amended) The method for producing a solid electrolytic capacitor as claimed in claim 55, in which the monomer compound represented by the general formula (VIII) above is a compound represented by the following formula (IX)

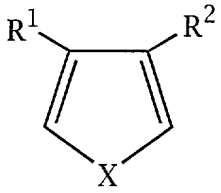


(IX)

[(] wherein R^4 and R^5 [have the same meanings as defined in claim 17)] each independently represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 alkyl group or a substituent for forming at least one 5-, 6- or 7-membered heterocyclic structure containing the two oxygen elements shown in the formula by combining the C1-6 alkyl groups to each other at any position, the ring structure formed in the scope thereof includes a chemical structure such as a vinylene group which may be substituted and a substituted phenylene group which maybe substituted.

57. (amended) A method for producing a capacitor [as claimed in claim 22] comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer comprising an electrically conducting polymer composition layer provided on the dielectric film, in which the

composition contains at least one anthracenemonosulfonate anion selected from anthracenesulfonic acid having a sulfonate group or derivatives thereof as a dopant, the method comprising polymerizing a monomer compound by the action of an oxidizing agent on the oxide dielectric film, in which the compound represented by the following formula (VIII):

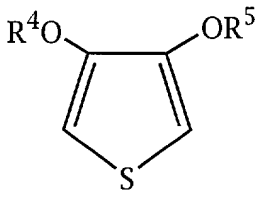


(VIII)

[(] wherein R^1 [,] and R^2 each independently represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 alkyl, a linear or branched, saturated or unsaturated C1-6 alkoxy group, a hydroxyl group, a halogen atom, a nitro group, a cyano group, a trihalomethyl group, a phenyl group and a substituted phenyl group, R^1 and R^2 may be combined to each other at any position to form at least one divalent chain for forming at least one 5-, 6- or 7-membered saturated or unsaturated ring structure, and X represents a hetero atom selected from S, O, Se, Te or NR^3, R^3 represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 hydrocarbon group, a phenyl group or an alkoxy group having a linear or branched, saturated or unsaturated C1-6 alkoxy group, the alkyl group and the alkoxy group represented by R^1, R^2 or R^3 may optionally contain in the chain thereof a carbonyl bond, an ether bond, an ester bond, an amide bond or an imino bond, [have the same meanings as defined in claim 27)] is polymerized in the presence of a compound which donates at least one anthracenemonosulfonate anion selected from anthracenesulfonic

acid and derivatives thereof to form a solid electrolyte layer.

[59] 58. (amended) The method for producing a solid electrolytic capacitor as claimed in claim 57, in which the monomer compound represented by general formula (VIII) above is a compound represented by the following general formula (IX):



(IX)

[(] wherein R^4 and R^5 [have the same meanings as defined in claim 28)] each independently represents a hydrogen atom, a linear or branched, saturated or unsaturated C1-6 alkyl or a substituent for forming at least one 5-, 6- or 7-membered cyclic structure containing the two oxygen elements shown in the formula by combining the C1-6 alkyl groups to each other at any position, the ring structure formed in the scope thereof includes a chemical structure such as vinylene group which may be substituted and a substituted phenylene group which may be substituted.

59. (amended) A method for producing a solid electrolytic capacitor [as claimed in claim 22] comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer comprising an electrically conducting polymer composition provided on the dielectric film, in which the composition contains at least one anthracenemonosulfonate anion selected from anthracenesulfonic acid having a sulfonate group or derivatives thereof as a dopant the method comprising polymerizing a monomer by the action of an oxidizing

agent to form a solid electrolyte layer on the dielectric film,

in which the method comprises the steps of dipping the valve acting metal having formed thereon the dielectric film layer in a solution containing a monomer compound, and dipping in a solution containing an oxidizing agent and at least one anthracenemonosulfonate anion selected from anthracenesulfonic acid having one sulfonate group and derivatives thereof.

66. (amended) A method for producing a solid electrolytic capacitor [as claimed in claim 22] comprising a valve acting metal having pores, a dielectric film formed on a surface of the valve acting metal, and a solid electrolyte layer comprising an electrically conducting polymer composition provided on the dielectric film, <u>in which the composition contains at least one anthracenemonosulfonate anion selected from anthracenesulfonic acid having a sulfonate group or derivatives thereof as a dopant,</u> the method comprising polymerizing a monomer by the action of an oxidizing agent to form a solid electrolyte layer on the dielectric film,

in which the method comprises the steps of dipping the valve acting metal having formed thereon the dielectric film layer in a solution containing an oxidizing agent and of dipping the metal in a solution containing a monomer compound and an anthracenemonosulfonate anion.

75. (amended) The method for producing a solid electrolytic capacitor as claimed in any one of claims 57 to [73] <u>72</u>, in which the oxidizing agent is a persulfate.